WHAT IS CLAIMED IS:

1. A multidimensional copolymer array, comprising a plurality of copolymers polymerized from at least two independently variable sets of monomers, wherein said polymerization is characterized by:

(a) selecting a first homologously varying series of monomers with non-varying polymerizable functional groups;

(b) selecting at least one additional homologously varying series of different monomers having non-varying polymerizable functional groups that are reactive with the polymerizable functional groups of said first series of monomers to form copolymers; and

(c) separately reacting a plurality of monomers from said first monomer series with a plurality of monomers from each of said additional monomer series to form said plurality of copolymers;

wherein said homologous variations of said monomer series are selected to determine the effect of independently varying at least two different structural features of said copolymer on at least one end-use property of said copolymer.

2. The copolymer array of claim 1, wherein said polymerization reaction is a free-radical process.

3. The copolymer array of claim 2, wherein said free-radical process is an ionic polymerization.

4. The copolymer array of claim 1, wherein said separate reactions are performed in parallel.

5. The copolymer array of claim 1, wherein said separate reactions are performed in solution.

6. The copolymer array of claim 1, wherein said separate reactions are performed in bulk.

7. The copolymer array of claim 1, wherein said separate reactions are performed in the presence of a catalyst.

8. The copolymer array of claim 1, wherein said separate reactions are performed in the absence of a catalyst.

9. The copolymer array of claim 1, wherein said copolymers are further modified by chemical reactions or cross-linking.

10. A multi-dimensional condensation-type copolymer array, comprising a plurality of copolymers polymerized from at least two independently variable sets of monomers, wherein said polymerization is characterized by:

(a) selecting a first homologously varying series of monomers with non-varying polymerizable functional groups;

(b) selecting at least one additional homologously varying series of different monomers having non-varying polymerizable functional groups that are reactive with the polymerizable functional groups of said first series of monomers to condense to form copolymers; and

(c) separately reacting a plurality of monomers from said first monomer series with a plurality of monomers from each of said additional monomer series to form said plurality of condensation-type copolymers;

wherein said homologous variations of said monomer series are selected to determine the effect of independently varying at least two different structural features of said copolymer on at least one end-use property of said copolymer.

11. The copolymer array of claim 10, wherein said condensation-type reaction is an interfacial process.

12. The copolymer array of claim 10, wherein said condensation-type reaction is a suspension process.

13. The copolymer array of claim 10, wherein said separate reactions are performed in parallel.

14. The copolymer array of claim 10, wherein said separate reactions are performed in solution.

15. The copolymer array of claim 10, wherein said separate reactions are performed in bulk.

16. The copolymer array of claim 10, wherein said separate reactions are performed in the presence of a catalyst.

17. The copolymer array of claim 10, wherein said separate reactions are performed in the absence of a catalyst.

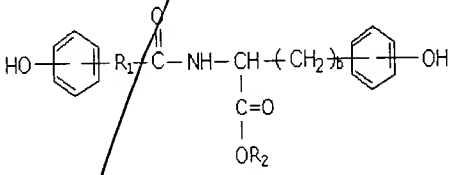
18. The copolymer array of claim 10, wherein said polymerizable functional groups of said first monomer series are amine or hydroxyl groups and said polymerizable functional groups of said additional series of monomers are selected from the group consisting of carboxylic acids, esters, anhydrides and isocyanates.

19. The copolymer array of claim 18, wherein said additional series of monomers comprise second and third monomer series, said second monomer series is selected from the group consisting of carboxylic acids, esters, anhydrides and isocyanates, and said third monomer series comprises a plurality of alkylene oxides selected from the group consisting of ethylene

oxide, propylene oxide, isopropylene oxide, butylene oxide, isobutylene oxide and random and block polymers and copolymers thereof.

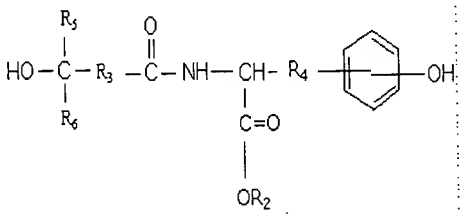
20. The copolymer array of claim 18, wherein said polymerizable functional groups of said first monomer series are hydroxyl groups and said additional monomer series comprise a monomer series with polymerizable carboxylic acid groups.

21. The copolymer array of claim 20, wherein said first monomer series comprises a plurality of different diphenol compounds, each having the general structure:



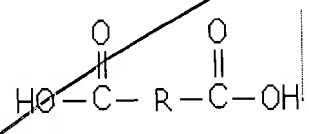
wherein R_1 is selected from the group consisting of -CH=CH-, $(-CH_2-)_a$, and -CHN(L_1L_2), in which a has a value from zero to eight, inclusive, and L_1 and L_2 are independently selected from the group consisting of hydrogen and straight and branched alkyl and alkylaryl groups containing up to 18 carbon atoms, provided that L_1 and L_2 are not both hydrogen; b independently has a value between zero and eight, inclusive; and R_2 is selected from the group consisting of straight and branched alkyl and alkylaryl groups containing up to 18 carbon atoms.

22. The copolymer array of claim 20, wherein said first monomer series comprises a plurality of different aromatic-aliphatic dihydroxy compounds, each having the general structure:



wherein R_3 is selected from the group consisting of -CH=CH-, $(-CH_2-)_a$, and $-CHN(L_1L_2)$, in which a has a value from zero to eight, inclusive, and L_1 and L_2 are independently selected from the group consisting of hydrogen and straight and branched alkyl and alkylaryl groups containing up to 18 carbon atoms, provided that L_1 and L_2 are not both hydrogen; R_5 and R_6 are each independently selected from the group consisting of hydrogen and straight or branched alkyl groups having up to 18 carbon atoms, R_4 is $(-CH_2-)_b$, wherein b independently has a value between zero and eight, inclusive; and R_2 is selected from the group consisting of straight and branched alkyl and alkylaryl groups containing up to 18 carbon atoms.

23. The copolymer array of claim 20, wherein said monomer series with polymerizable carboxylic acid groups comprises a plurality of different dicarboxylic acid compounds, each having the general structure:



wherein R is selected from the group consisting of saturated and unsaturated, substituted and unsubstituted alkyl, aryl and alkylaryl groups containing up to 18 carbon atoms.

24. The copolymer array of claim 21, wherein for one or more of said monomers of said first monomer series, at least one of R_2, L_1 or L_2 contain at least one ether linkage.

25. The copolymer array of claim 22, wherein for one or more of said monomers of said first monomer series, at least one of R_2, R_5, R_6, L_1 or L_2 contain at least one ether linkage.

26. The copolymer array of claim 23, wherein for one or more of said monomers of said dicarboxylic acid monomer series, R contains at least one ether linkage.

27. The copolymer array of claim 10, wherein said copolymers are further modified by chemical reactions or cross-linking.

28. A method for determining the effect of independently varying at least two different structural features of a copolymer on at least one end-use property of said copolymer, comprising:

(a) measuring at least one end-use property of each copolymer of said copolymer array of claim 1; and

(b) comparing the variations in each end-use property measured for each of said copolymers as a function of the homologous variation within said monomer series from which said copolymers were polymerized to determine any relationship between said homologous variations and said end-use property variations among said copolymers;

thereby identifying specific members of said plurality of copolymers having useful properties for specific end-uses.

29. The method of claim 28, wherein said polymerization reaction is a free-radical process.

30. The method of claim 29, wherein said free-radical process is an ionic polymerization.

31. The method of claim 28, wherein said separate reactions are performed in parallel.

32. The method of claim 28, wherein said separate reactions are performed in solution.

33. The method of claim 28, wherein said separate reactions are performed in bulk.

34. The method of claim 28, wherein said separate reactions are performed in the presence of a catalyst.

35. The method of claim 28, wherein said separate reactions are performed in the absence of a catalyst.

36. The method of claim 28, wherein said copolymers are further modified by chemical reactions or cross-linking.

37. The method of claim 28, wherein said end-use properties are measured by ELISA, SAM, chromatographic methods, DSC, TGA, DMA, TMA, microscopic techniques or processing methods.

38. The method of claim 28, wherein the end-use property that is measured is a mechanical property, a viscoelastic property, a morphological property, an electrical property, an optical property, solute or gas permeability, surface tension or a thermal property.

39. The method of claim 28, wherein the end-use property that is measured is antibacterial activity, blood compatibility, tissue compatibility, drug release characteristics, biological interactions with living organisms, hydrolytic degradation or protein adsorption characteristics.

40. The method of claim 28, wherein the end-use property that is measured is polymer processability, radiation stability, sterilizability, adhesive properties, hydrophobic characteristics or stability to specific reaction conditions.

41. A method for determining the effect of independently varying at least two different structural features of a condensation-type copolymer on at least one end-use property of said copolymer, comprising:

(a) measuring at least one end-use property of each copolymer of said copolymer array of claim 10; and

(b) comparing the variations in each end-use property measured for each of said copolymers as a function of the homologous variation within said monomer series from which said copolymers were polymerized to determine any relationship between said homologous variations and said end-use property variations among said copolymers;

thereby identifying specific members of said plurality of copolymers having useful properties for specific end-uses.

42. The method of claim 41, wherein said condensation-type copolymers are prepared by an interfacial process.

43. The method of claim 41, wherein said condensation-type copolymers are prepared by a suspension process.

44. The method of claim 41, wherein said condensation-type copolymers are synthesized in parallel.

45. The method of claim 41, wherein said condensation-type copolymers are polymerized in solution.

46. The method of claim 41, wherein said condensation-type copolymers are polymerized in bulk.

47. The method of claim 41, wherein said condensation-type copolymers are polymerized in the presence of a catalyst.

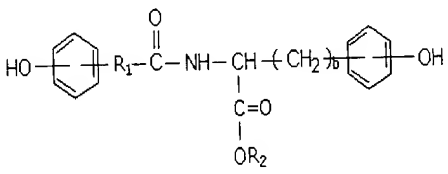
48. The method of claim 41, wherein said condensation-type copolymers are polymerized in the absence of a catalyst.

49. The method of claim 41, wherein said polymerizable functional groups of said first monomer series are amine or hydroxyl groups and said polymerizable functional groups of said additional series of monomers are selected from the group consisting of carboxylic acids, esters, anhydrides and isocyanates.

50. The method of claim 49, wherein said additional series of monomers comprise second and third monomer series, said second monomer series is selected from the group consisting of carboxylic acids, esters, anhydrides and isocyanates, and said third monomer series comprises a plurality of alkylene oxides selected from the group consisting of ethylene oxide, propylene oxide, isopropylene oxide, butylene oxide, isobutylene oxide and random and block polymers and copolymers thereof.

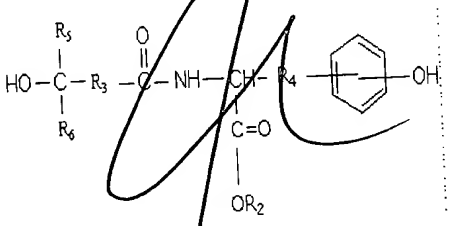
51. The method of claim 49, wherein said polymerizable functional groups of said first monomer series are hydroxyl groups and said additional monomer series comprise a monomer series with polymerizable carboxylic acid groups.

52. The method of claim 51, wherein said first monomer series comprises a plurality of different diphenol compounds, each having the general structure:



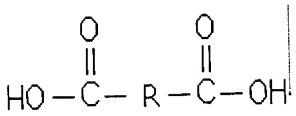
wherein R_1 is selected from the group consisting of -CH=CH-, $(-CH_2-)_a$, and $-CHN(L_1L_2)$, in which a has a value from zero to eight, inclusive, and L_1 and L_2 are independently selected from the group consisting of hydrogen and straight and branched alkyl and alkylaryl groups containing up to 18 carbon atoms, provided that L_1 and L_2 are not both hydrogen; b independently has a value between zero and eight, inclusive; and R_2 is selected from the group consisting of straight and branched alkyl and alkylaryl groups containing up to 18 carbon atoms.

53. The method of claim 51, wherein said first monomer series comprises a plurality of different aromatic-aliphatic dihydroxy compounds, each having the general structure:



wherein R_3 is selected from the group consisting of -CH=CH-, $(-CH_2-)_a$, and $-CHN(L_1L_2)$, in which a has a value from zero to eight, inclusive, and L_1 and L_2 are independently selected from the group consisting of hydrogen and straight and branched alkyl and alkylaryl groups containing up to 18 carbon atoms, provided that L_1 and L_2 are not both hydrogen; R_5 and R_6 are each independently selected from the group consisting of hydrogen and straight or branched alkyl groups having up to 18 carbon atoms, R_4 is $(-CH_2-)_b$, wherein b independently has a value between zero and eight, inclusive; and R_2 is selected from the group consisting of straight and branched alkyl and alkylaryl groups containing up to 18 carbon atoms.

54. The method of claim 51, wherein said monomer series with polymerizable carboxylic acid groups comprises a plurality of different dicarboxylic acid compounds, each having the general structure:



wherein R is selected from the group consisting of saturated and unsaturated, substituted and unsubstituted alkyl, aryl and alkylaryl groups containing up to 18 carbon atoms.

55. The method of claim 52, wherein for one or more of said monomers of said first monomer series, at least one of R_2, L_1 or L_2 contain at least one ether linkage.

56. The method of claim 53, wherein for one or more of said monomers of said first monomer series, at least one of R_2, R_5, R_6, L_1 or L_2 contain at least one ether linkage.

57. The method of claim 54, wherein for one or more of said monomers of said dicarboxylic acid monomer series, R contains at least one ether linkage.

58. The method of claim 41, wherein said copolymers are further modified by chemical reactions or cross-linking.

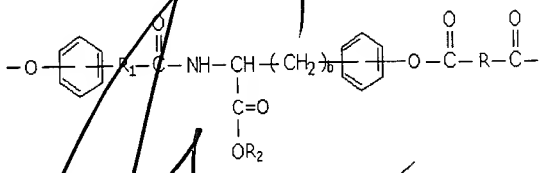
59 The method of claim 41, wherein said end-use properties are measured by ELISA, SAM, chromatographic methods, DSC, TGA, DMA, TMA, microscopic techniques or processing methods.

60. The method of claim 41, wherein the end-use property that is measured is a mechanical property, a viscoelastic property, a morphological property, an electrical property, an optical property, solute or gas permeability, surface tension or a thermal property.

61. The method of claim 41, wherein the end-use property that is measured is antibacterial activity, blood compatibility, tissue compatibility, drug release characteristics, biological interactions with living organisms, hydrolytic degradation or protein adsorption characteristics.

62. The method of claim 41, wherein the end-use property that is measured is polymer processability, radiation stability, sterilizability, adhesive properties, hydrophobic characteristics or stability to specific reaction conditions.

63. A polyarylate comprising repeating units having the structure:



wherein R is selected from the group consisting of saturated and unsaturated, substituted and unsubstituted alkyl, aryl and alkylaryl groups containing up to 18 carbon atoms;

R_1 is selected from the group consisting of -CH=CH-, $(-CH_2-)_a$, and $-CHN(L_1L_2)$, in which a has a value from zero to eight, inclusive, and L_1 and L_2 are independently selected from the group consisting of hydrogen and straight and branched alkyl and alkylaryl groups containing up to 18 carbon atoms, provided that L_1 and L_2 are not both hydrogen;

b independently has a value between zero and eight, inclusive; and

R_2 is selected from the group consisting of straight and branched alkyl and alkylaryl groups containing up to 18 carbon atoms; and

wherein at least one of R, R_2, and, when R_1 is $-CHNL_1L_2$, L_1 or L_2 contains at least one ether linkage.

64. The polyarylate of claim 63,wherein R_1 is $-CH_2-CH_2-$, b is one and at least one of R or R_2 contains at least one ether linkage.

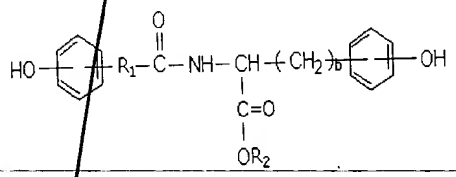
65. The polyarylate of claim 64, wherein R_2 is selected from the group consisting of hydrogen, ethyl, butyl, octyl and benzyl, and R contains at least one ether linkage.

66. The polyarylate of claim 65 wherein R is $-CH_2-O-CH_2-$ or $-CH_2-O-CH_2$ $-CH_2-O-CH_2-$.

67. The polyarylate of claim 64, wherein R is selected from the group consisting of $-CH_2-C(=O)-$, $-CH_2-CH_2-C(=O)-$, $-CH=CH-$ and $(-CH_2-)_z$, wherein z is an integer between two and eight, inclusive.

68. The polyarylate of claim 67, wherein R_2 is $-CH_2-CH_2-O-CH_2-CH_2-O-CH_2-CH_2-OH$.

69. A tyrosine-derived diphenol compound having the structure:



wherein R_1 is selected from the group consisting of $-CH=CH-$, $(-CH_2-)_a$, and $-CHN(L_1L_2)$, in which a has a value from zero to eight, inclusive, and L_1 and L_2 are independently selected from the group consisting of hydrogen and straight and branched alkyl and alkylaryl groups containing up to 18 carbon atoms, provided that L_1 and L_2 are not both hydrogen;

b independently has a value between zero and eight, inclusive; and

R_2 is selected from the group consisting of straight and branched alkyl and alkylaryl groups containing up to 18 carbon atoms; and

wherein at least one of R_2 or, when R_1 is $-CHNL_1L_2$, L_1 or L_2 contains at least one ether linkage.

70. The diphenol of claim 69, wherein R_1 is $-CH_2-CH_2-$, b is one and R contains at least one ether linkage.

71. The diphenol of claim 70, wherein R_2 is

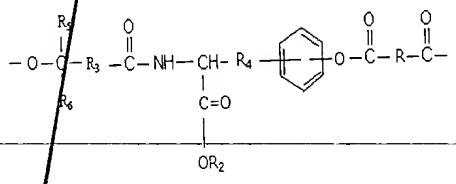
$-CH_2-CH_2-O-CH_2-CH_2-O-CH_2-CH_2-OH$.

72. The diphenol of claim 69, wherein R_2 is selected from the group consisting of hydrogen, ethyl, butyl, octyl and benzyl, and R_1 is $-CHNL_1L_2$, wherein at least one of L_1 or L_2 contains at least one ether linkage.

73. The diphenol of claim 72, wherein at least one of L_1 or L_2 is

$-CH_2-CH_2-O-CH_2-CH_2-O-CH_2-CH_2-OH$.

74. A poly(amide ester) comprising repeating units having the structure:



wherein R_3 is selected from the group consisting of $-CH=CH-$, $(-CH_2-)_a$, and $-CHN(L_1L_2)$, in which a has a value from zero to two, inclusive, and L_1 and L_2 are independently selected from the group consisting of hydrogen and straight and branched alkyl and alkylaryl groups containing up to 18 carbon atoms, provided that L_1 and L_2 are not both hydrogen;

R_5 and R_6 are each independently selected from the group consisting of hydrogen and straight or branched alkyl groups having up to 18 carbon atoms;

R_4 is $(-CH_2-)_b$, wherein b independently has a value between zero and eight, inclusive;

R_2 is selected from the group consisting of straight and branched alkyl and alkylaryl groups containing up to 18 carbon atoms; and

R is selected from the group consisting of saturated and unsaturated, substituted and unsubstituted alkyl, aryl and alkylaryl groups containing up to 18 carbon atoms; and

wherein at least one of R, R_2, R_5, R_6 and, when R_3 is $-CHNL_1L_2$, L_1 or L_2, contains at least one ether linkage.

75. The poly(amide ester) of claim 74 wherein R_3 is $(-CH_2-)_a$ and a is zero, b is one, one of R_5 or R_6 is hydrogen, the other of R_5 or R_6 is a methyl group, and at least one of R or R_2 contains at least one ether linkage.

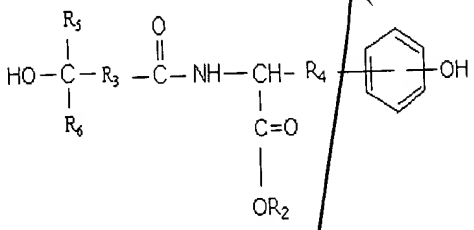
76. The poly(amide ester) of claim 75, wherein R_2 is selected from the group consisting of hydrogen, ethyl, butyl, octyl and benzyl, and R contains at least one ether linkage.

77. The poly(amide ester) of claim 76, wherein R is $-CH_2-O-CH_2-$ or $-CH_2-O-CH_2-CH_2-O-CH_2-$.

78. The poly(amide ester) of claim 75, wherein R is selected from the group consisting of $-CH_2-C(=O)-$, $-CH_2-CH_2-C(=O)-$, $-CH=CH-$ and $(-CH_2-)_z$, wherein z is an integer between two and eight, inclusive.

79. The poly(amide ester) of claim 78, wherein R_2 is $-CH_2-CH_2-O-CH_2-CH_2-O-CH_2-CH_2-OH$.

80. An aliphatic-aromatic dihydroxy monomer having the structure:



wherein R_3 is selected from the group consisting of -CH=CH-, $(-CH_2-)_a$, and $-CHN(L_1L_2)$, in which a has a value from zero to two, inclusive, and L_1 and L_2 are independently selected from the group consisting of hydrogen and straight and branched alkyl and alkylaryl groups containing up to 18 carbon atoms, provided that L_1 and L_2 are not both hydrogen;

R_5 and R_6 are each independently selected from the group consisting of hydrogen and straight or branched alkyl groups having up to 18 carbon atoms;

R_4 is $(-CH_2-)_b$, wherein b independently has a value between zero and eight, inclusive; and

R_2 is selected from the group consisting of straight and branched alkyl and alkylaryl groups containing up to 18 carbon atoms; and

wherein at least one of R_2, R_5, R_6 and, when R_3 is $-CHNL_1L_2$, L_1 or L_2, contains at least one ether linkage.

81. The dihydroxy compound of claim 80,wherein R_3 is $(-CH_2-)_a$ and a is zero, b is one, one of R_5 or R_6 is hydrogen, the other of R_5 or R_6 is a methyl group, and R_2 contains at least one ether linkage.

82. The dihydroxy compound of claim 81, wherein R_2 is $-CH_2-CH_2-O-CH_2-CH_2-O-CH_2-CH_2-OH$.

83. The dihydroxy compound of claim 80, wherein R_2 is selected from the group consisting of hydrogen, ethyl, butyl, octyl and benzyl, and at least one of R_3,R_5 or R_6 contains at least one ether linkage.

84. The dihydroxy compound of claim 83, wherein one of R_5 or R_6 is hydrogen, the other of R_5 or R_6 is a methyl group, and R_3 is $-CHNL_1L_2$, wherein at least one of L_1 or L_2 contains at least one ether linkage.

85. The dihydroxy compound of claim 83, wherein R_3 is $(-CH_2-)_a$ and a is zero, and at least one of R_5 or R_6 contains at least one ether linkage.